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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,005	06/27/2003	Koji Masuda	239545US2	4936
22850	7590	06/08/2005	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			PHAM, HAI CHI	
			ART UNIT	PAPER NUMBER
			2861	

DATE MAILED: 06/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary	Application No.	Applicant(s)	
	10/607,005	MASUDA, KOJI	
	Examiner	Art Unit	
	Hai C. Pham	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-13, 16-19, 21 and 22 is/are rejected.
- 7) ☒ Claim(s) 14, 15 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings were received on 03/28/05. These drawings are accepted.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 01/25/05 listing related applications was received. The information disclosure statement is being considered by the examiner, and has been placed in the application file.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-5, 8-13 and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Obata (U.S. 6,172,700) in view of Yamanaka et al. (JP 2001-138568) and Urata (U.S. 4,956,684).

Obata discloses a writing device for an image forming apparatus a light emitting device array (LED array 1) that further comprises a plurality of light emitting device array chips (LED chips 3), each of which comprises a plurality of light emitting devices (LEDs 2) that are arranged at a predetermined interval P (distance a between nearby LEDs),

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and an image forming device array that further comprises image forming devices (although not shown, the imaging lenses such as the rod lens array are inherently included in the electrostatic printing device using a light emitting device array for forming an electrostatic latent image on a photosensitive drum), wherein the light volume of the light emitting devices that are located on and near an edge of the light emitting device array chip can be set differently from other light emitting devices (due to gap between nearby LED chips 3, which is different from the distance a between nearby LEDs within each LED chip, the quantity of light emitted by the LEDs located at the ends of each of the LED chips). With regard to claims 11 and 21, Obata further teaches the light volume of the light emitting devices being set up based on the gradient of an approximated regression line for exposure areas corresponding to a plurality of the light emitting devices (the corrected image data corresponding to the interval between nearby LED chips being of halftone).

However, Obata fails to explicitly teach the light volume of the light emitting devices being set up such that a predefined property value concerning an exposure intensity distribution of each of the light emitting devices falls within a predetermined range, the predetermined range being defined for an effective image area in its entirety, the determination of the correlation between the light volume and the property value of the light emitting device, and the compensation value being a driving current, more than half elements being located at ends of the LED chip, and the predetermined cycle.

It is old and well known in the art that there is a problem inherent in the printer head using the LED elements that variation in an exposure amount of the

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photosensitive body is caused by the characteristics of each individual LED elements as evidenced by Urata in Fig. 5. Such variation of the exposure amount would be more accentuated when a plurality of LED array chips are employed wherein the light intensity is weak at the connecting portion C' between the LED chips as disclosed by Urata in Fig. 7. Urata further discloses that various methods for correcting such unevenness of the exposure amount have been proposed, one of which would adjust the drive current that energizes each of the LED elements by trimming the series corresponding resistors (see Background of the Invention section).

On the other hand, Yamanaka et al. discloses a method of compensating for output variations in a printing head using a plurality of LED chips (2), each having a plurality of light emitting elements, the output variation being due to the variation in the LED luminescence property, wherein the light intensity distribution for the plural light emitting elements is acquired (Fig. 4) by measuring the intensity of light emitted by the light emitting elements at a predetermined cycle to determine a property value of the intensity distribution, which lies between the IMAX and IMIN values in order to adjust the light intensity emitted by each of the light emitting elements, based on which the driving current is adjusted for each of the light emitting elements to obtain a uniform luminance across the image exposure area. Yamanaka et al. teaches the predetermined cycle comprising M+N of light emitting elements, where M=N=1 (every other LED elements being selected).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to set the compensation of the light intensity distribution of

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the LED units of Obata by correcting the corresponding driving currents such that the light intensity distribution is uniform as taught by Yamanaka et al. The motivation for doing so would have been to correct the inherent unevenness luminance of the individual light emitting elements as well as to correct the weak intensity distribution at the connecting portions of the adjacent LED array chips to produce a highly uniform light distribution across the image exposure area, as suggested by Urata.

The method claims 10 and 22 are deemed to be clearly anticipated by the functions of the above structures.

5. Claims 7 and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Obata in view of Yamanaka et al. and Urata, as applied to claim 11 above, and further in view of Sawada (JP 8-118722).

Obata, as modified by Yamanaka et al. and Urata, discloses all the basic limitations of the claimed invention except for the light volume of each of the light emitting devices is set up based on the magnitude of the interval of the light emitting device located at the ends of the LED chips as compared to the interval between nearby LEDs.

Sawada, an acknowledged prior art, discloses a driving circuit for an LED print head, which comprises a plurality of LED array chips having a gap G between adjacent LED array chips being different from the interval P of the light emitting elements, wherein the driving current flowing through the light emitting elements located at the ends of each LED array chip varies dependent on the difference between the intervals

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G and P, namely the driving current is increased when G is larger than P and is decreased when G is smaller than P (see English Translation, paragraphs [0033] and [0034]).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to adjust the driving current supplied to the light emitting elements disposed at the end of the LED array chip in accordance to the relationship between the intervals G and P as taught by Sawada in the modified device of Obata. The motivation for doing so would have been doing to be able to effectively cancel the density difference occurred at the gap between two adjoining LED array chips, which is dependent on the discrepancy between the above gap and the pitch of the light emitting elements as explained by Sawada.

Allowable Subject Matter

6. Claims 14-15 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

5. Applicant's arguments filed 03/28/05 have been fully considered but they are not persuasive.

The Applicant argued that “[R]egardless of whether the prior or simplified approach is employed, Yamanaka teaches that the diameter of each LED is fixed to the

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same value". The examiner respectfully disagrees. Yamanaka clearly teaches correcting the unevenness of the exposure amount due to the variation of the LED characteristics as well as due to the lens property by adjusting the actual current driving each of the LED elements based on the measured quantity of the light emitted by the LED elements taken in a predetermined cycle so as to obtain a uniform exposure amount (see English translation, paragraphs [0025], [0031], [0042], [0044], [0045]). On the other hand, Urata recognizes that "[T]here arises, however, a problem inherent in the printer head using the LED elements that variation in an exposure amount of the photosensitive body is caused by dispersion in LED characteristics" (col. 1, lines 39-42), and that "[T]he light intensity is strong at the LED element portions A', whereas it is weak at the boundary B' between the LED elements and at the connecting portion C' between the LED chips, thus forming gorges" (col. 2, lines 48-52), and that there is a need for correcting such unevenness of the luminescence. Since Obata, Yamanaka and Urata are all in the same problem solving area, the motivation and the teachings for a such correction as suggested by Urata and Yamanaka, respectively, would have been recognized in the pertinent art of Obata. Therefore, the proposed modification of Obata in view of Yamanaka would not render Obata's device unsatisfactory as stated by Applicant.

The Applicant further argued that Obata fails to teach "the determination of the correlation between the light volume and the property value of the light emitting device, and the compensation value being a driving current. However, such deficiency in Obata has been remedied by Yamanaka (please refer to the rejection related to the above-

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mentioned claimed limitations in section 4 and the response to arguments in the preceding paragraph of this Office action).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C. Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

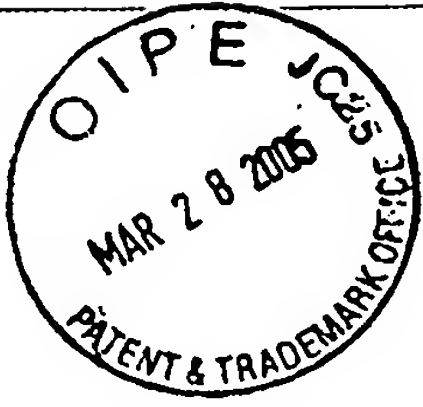
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (571) 272-1934. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**HAI PHAM
PRIMARY EXAMINER**

June 4, 2005



OBLON, SPIVAK, et al
Docket No: 239545US2
Inventor: Koji MASUDA
Serial No: 10/607,005
Reply to OA dated: 12/28/2004
Replacement Sheet

FIG.29A

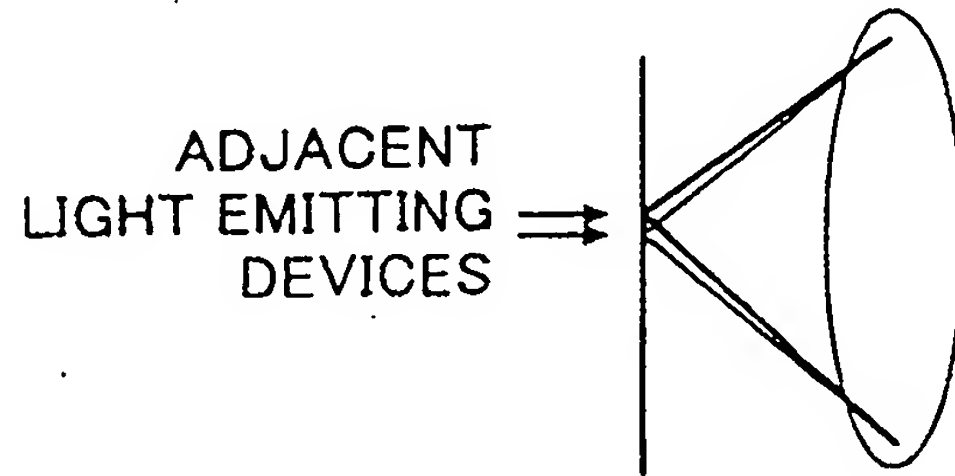
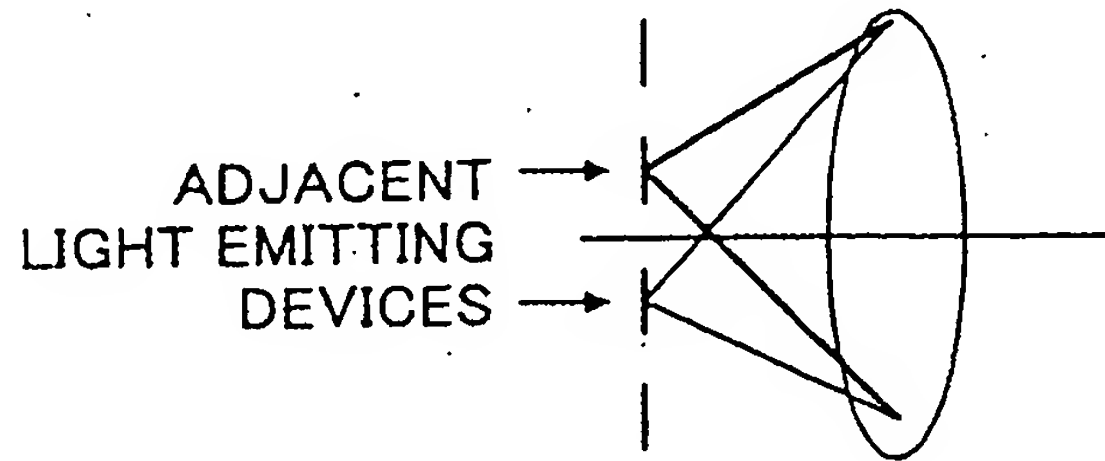


FIG.29B



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FIG.30

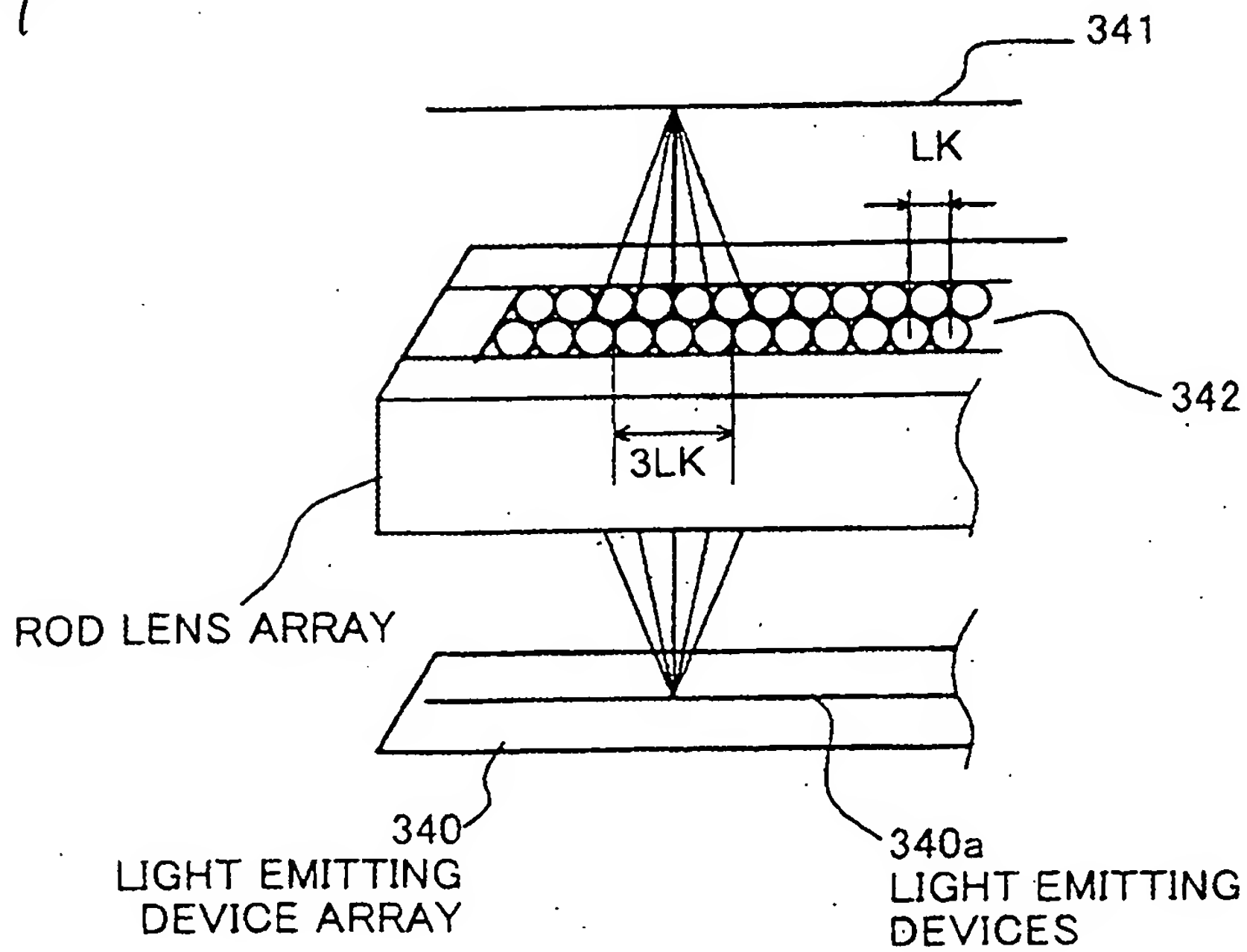
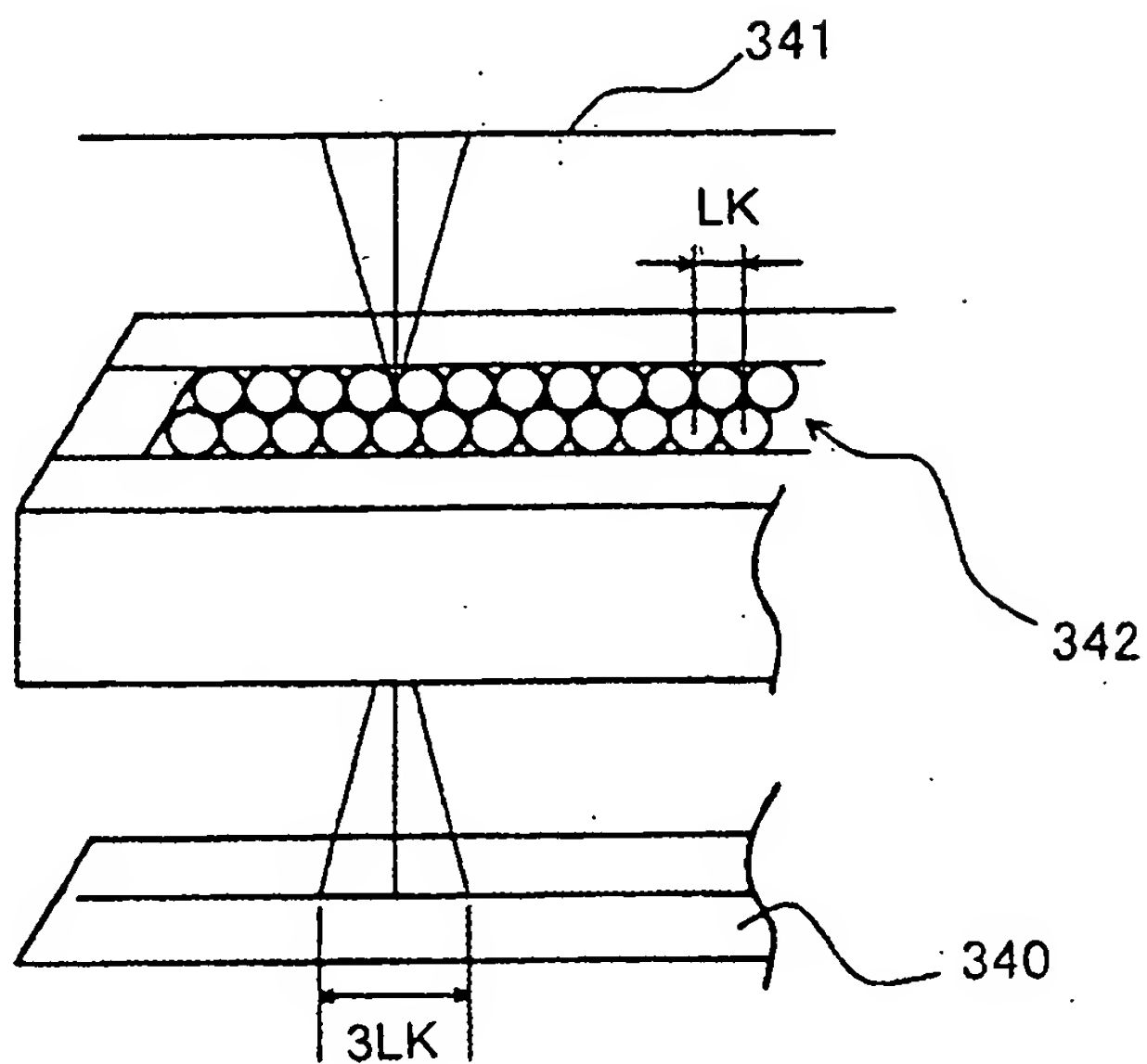
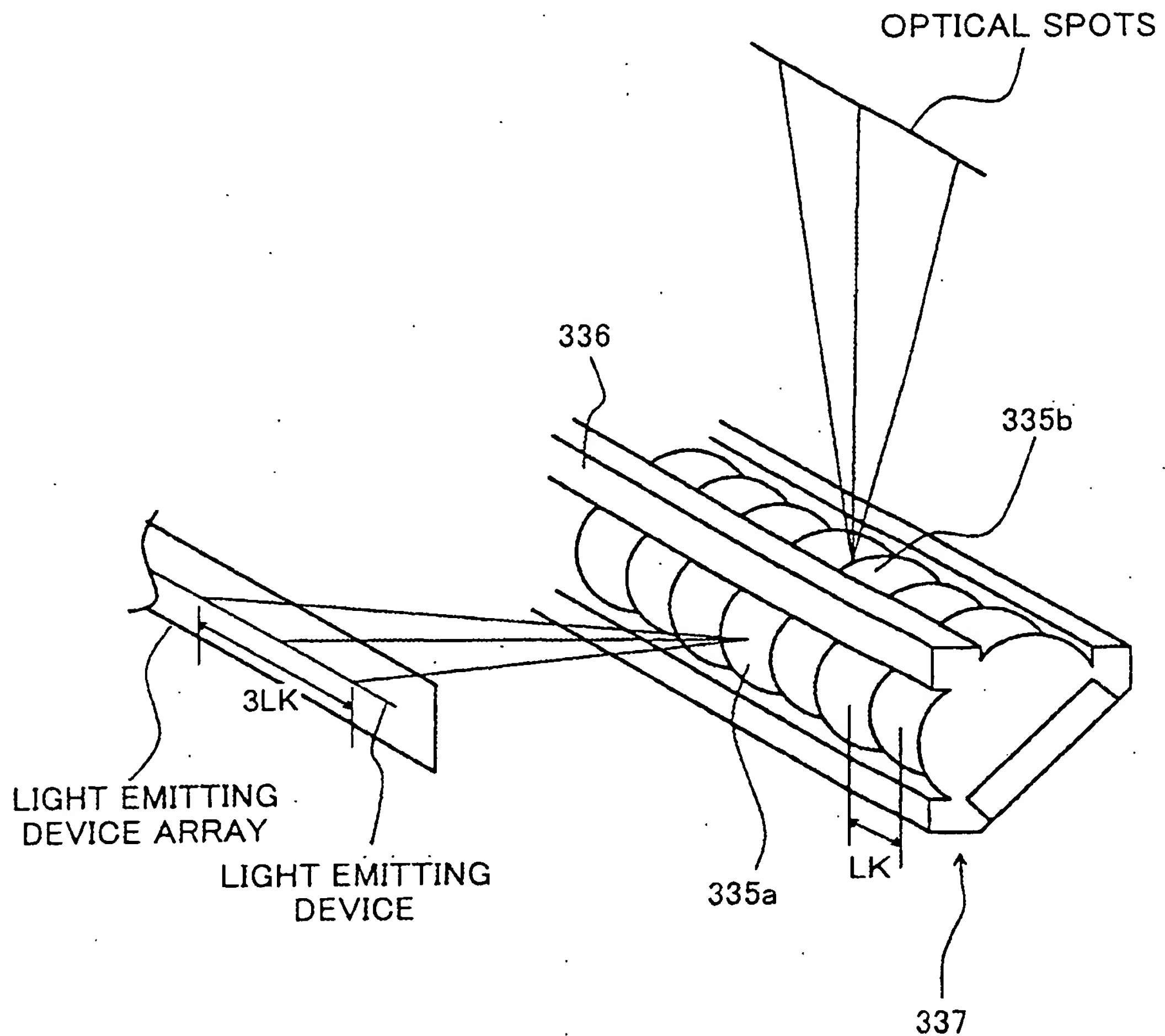


FIG.31



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FIG.33



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HCB
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